2. Surface Z need not be planar or coincident with the surface under the plug release catch. Surface Z projections must not prevent insertion, latching, and unlatching of the standard 8-position plug on Figure 68.500(i)(2)(i).
3. The preferred plug stop surface is indicated. If some other internal feature is used as a plug stop, it must be located so that the axial movement of a latched plug is no greater than 1.1430 mm (.045) inch.
4. To prevent mistargeting between the plug and jack contacts, the jack contacts should be completely contained in their individual contact zones, (.7112 mm (.028 inch) max wide), where they extend into the jack openings. There is no location requirement for jack contacts below these zones (5.8420 mm (.230 inch) max), but adequate contact separation must be maintained to prevent electrical breakdown. These shaded contact zones should be centrally located, (include all locating tolerances), about the jack opening width 11.9126 mm (.469 inch) Ref, (Datum–W–). Contacts located outside of these zones may result in mistargeting between the jack and plug contacts.
5. All inside and outside corners in the plug cavity to be .3810 mm (.015 inch) radius max unless specified.
6. These surfaces shall have 0°15′ maximum draft.
7. Relief inside the dotted areas on both sides of the jack opening is permitted. The 6.8326 mm (.269 inch) Ref and 11.9126 mm (.469 inch) Ref Gauge Requirements must be maintained in each of the corners indicated, (Ref. 1.5240 mm (.060 inch) min), to assure proper plug/jack interface guidance.
8. 4.0640 mm (.160 inch) and 6.2992 mm (.248 inch) dimensions to be centrally located to jack opening width –W– within ±.1270 mm (.005).
9. The contact lengths shall be such that the contacts will always be contained inside the guide slots and the contacts must move freely in the slots so as not to restrain plug insertion or damage jack contacts.
10. Gauge Requirements:

GO: The jack shall be capable of accepting and 11.78560 × 6.70560 mm (.4640 × .2640 inch) gauge and the gauge shall be capable of being removed with a maximum force of 8.9 newtons (2.0 pounds).

NO GO: The jack shall not accept either a 12.03960 × 6.4516 mm (.4740 × .254 inch) horizontal width of opening gauge or a 6.95960 × 11.5824 mm (.2740 × .456 inch) vertical height of opening gauge. However, if the gauge is accepted, the force necessary to remove the gauge shall be minimum of .83 newtons (3.0 ounces).

Removal forces do not include forces contributed by contact springs nor shall external forces be applied to the jack that will affect these removal forces.

Gauges shall have a .7620 mm (.030 inch) radius on the nose and a .3810 mm (.015 inch) radius on all edges with clearance provided for contracts.

[41 FR 28699, July 12, 1976, as amended at 45 FR 52151, Aug. 6, 1980; 50 FR 27251, July 2, 1985; 58 FR 44907, Aug. 25, 1993; 62 FR 36465, July 8, 1997]

§ 68.502 Configurations.

This section describes connection configurations which telephone subscribers may request their local telephone company to provide, in accordance with § 68.104 of these rules. In the absence of a request for a specific jack configuration, the telephone company shall install the standard jack depicted in § 68.502(a)(1). The listed configurations are for connections to be made by the telephone company to the standard jacks specified in this subpart. Plugs on registered terminal equipment and registered protective circuitry shall be wired so as to be compatible with the jack connections specified herein. The following nomenclature is used in this section:

T/R—Connections to the ''tip'' and ''ring'' wires of a telephone communications line, trunk, channel or facility.

A/A1—Connections to the ''hold'' functions of key telephone systems which use such connections. In such systems, the ''A'' lead corresponding to a particular telephone line is shorted to the ''A1'' lead when that line is placed in the ''off-hook'' state to permit proper operation of the ''hold'' functions associated with that line.

MB/MB1—Connections to leads implementing a make-busy feature where required. The MB lead is shorted by the terminal equipment to the MB1 lead when the corresponding telephone line is to be placed in an unavailable, or artificially busy condition.

Bridged—A bridged connection is a parallel connection.

Data—Data configurations are those which use jacks incorporating components to limit signal power levels of data equipment. Data equipment with a maximum signal power output of −9 dBm may be connected to other than data configurations. *See* § 68.308 of these rules.

A ''USOC'' (Universal Service Ordering Code) is specified for each configuration. These USOCs are generic telephone company service ordering codes. If a telephone subscriber wishes to

have the telephone company install a standard jack other than the one depicted in §68.502(a)(1) below, he shall specify the appropriate USOC when requesting the installations.

(a) *Bridged configurations other than data; single line connections*—(1) *Bridged T/R; 6-position jack.*

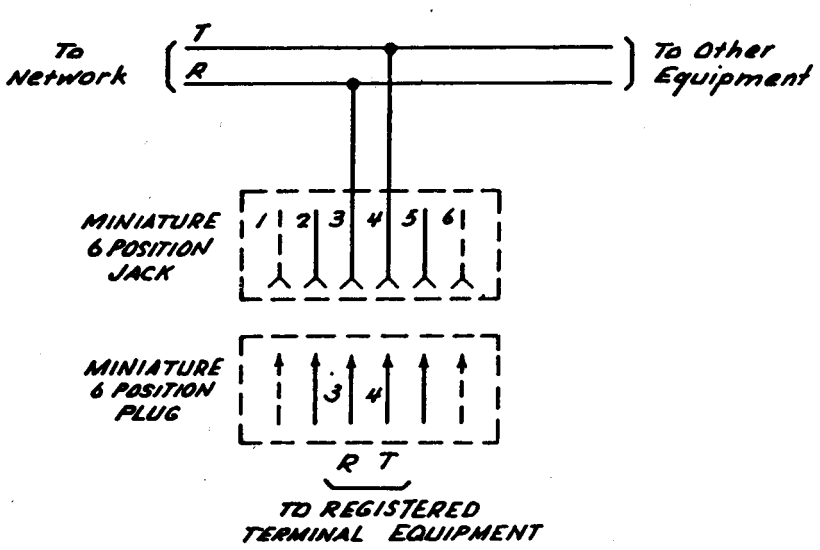
ELECTRICAL NETWORK CONNECTION: Single line bridged tip and ring only—Conductors 1, 2, 5 and 6 are reserved for telephone company use.

UNIVERSAL SERVICE ORDER CODE (USOC): RJ11W for Portable Wall-Mounted equipment—RJ11C all others.

MECHANICAL ARRANGEMENT: Miniature 6 position jack.

TYPICAL USAGE: Single line non-key telephone, ancillary devices, PBXs and key telephone systems.

WIRING DIAGRAM:



(2) *Bridged T/R; 3-position weatherproof jack.*

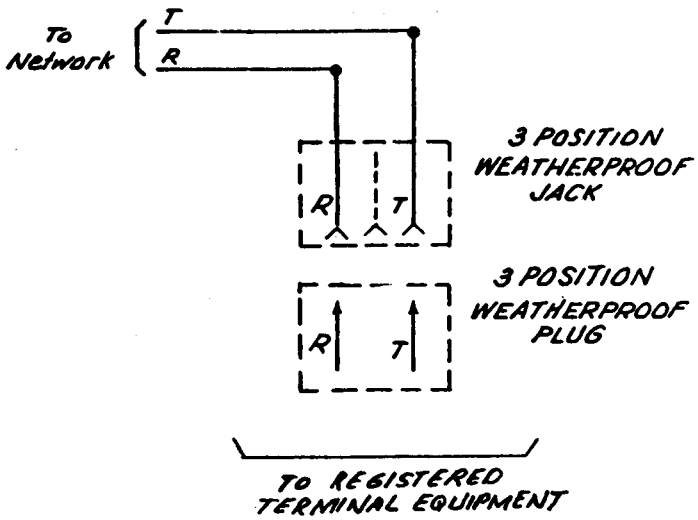
ELECTRICAL NETWORK CONNECTION: Single line bridged tip and ring.

UNIVERSAL SERVICE ORDER CODE: RJ15C.

MECHANICAL ARRANGEMENT: 3 position weatherproof jack.

TYPICAL USAGE: Providing telephone service to boats in marinas.

WIRING DIAGRAM:



(3) *Bridged T/R with make-busy arrangement; 6-position jack.*

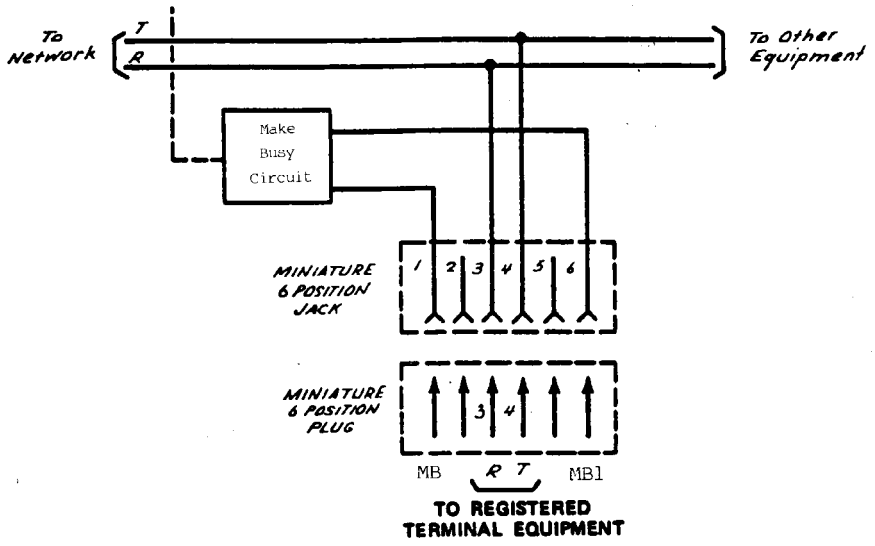
ELECTRICAL NETWORK CONNECTION: Single-line bridged tip and ring only with MB/MB1 leads. Conductors 2 and 5 are reserved for telephone company use.

UNIVERSAL SERVICE ORDER CODE (USOC): RJ18W for portable wall-mounted equipment—RJ18C for all others.

MECHANICAL ARRANGEMENT: Miniature 6-position jack.

TYPICAL USAGE: Single-line non-key telephone and ancillary devices connected directly to central office lines, where a make-busy requirement is needed.

WIRING DIAGRAM:



(b) *Series configurations*—(1) *Series T/R ahead of all station equipment; 8-position series jack.*

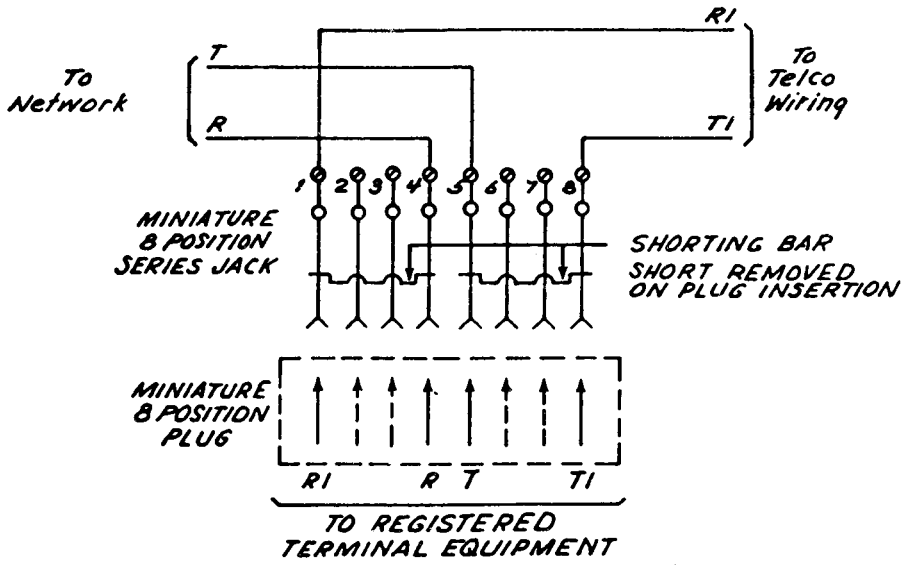
ELECTRICAL NETWORK CONNECTION: Series tip and ring ahead of all station equipment. Conductors 2, 3, 6 and 7 are reserved for telephone company use.

UNIVERSAL SERVICE ORDER CODE (USOC): RJ31X.

MECHANICAL ARRANGEMENT: Miniature 8 position series jack.

TYPICAL USAGE: Alarm reporting devices.

WIRING DIAGRAM:



(2) [Reserved]

(3) *Series single-line tip and ring ahead of all station equipment; 8-position series jack equipped with continuity circuit.*

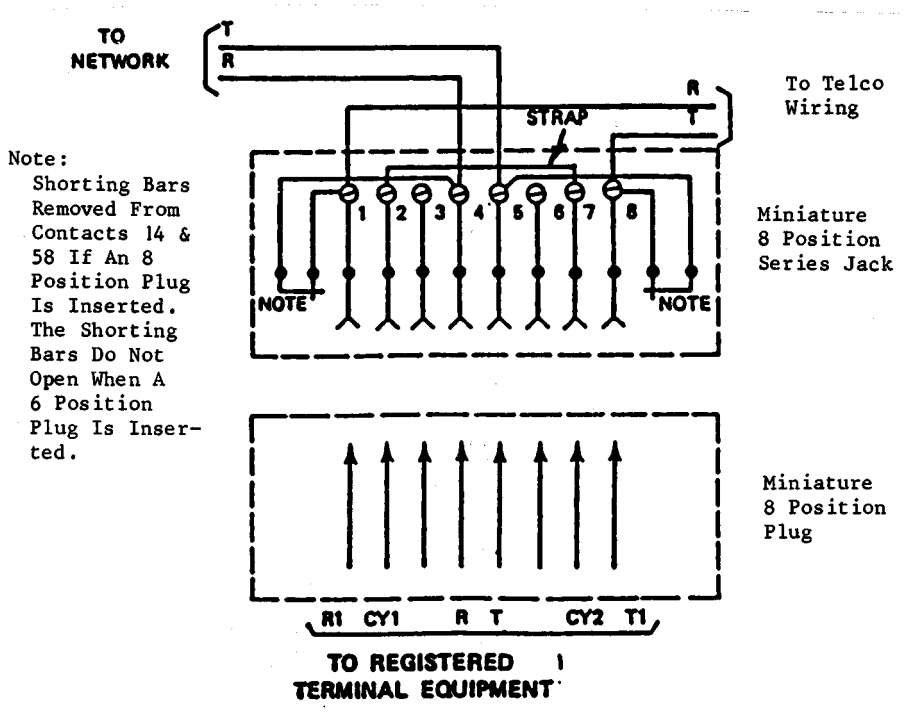
ELECTRICAL NETWORK CONNECTION: Series tip and ring ahead of all station equipment with continuity circuit. Conductors 3 and 6 are reserved for telephone company use.

UNIVERSAL SERVICE ORDER CODE (USOC): RJ38X.

MECHANICAL ARRANGEMENT: Miniature 8-position series jack.

TYPICAL USAGE: Alarm reporting devices.

WIRING DIAGRAM:



(c) *Two-line configurations*—(1) *Bridged T/R; 6-position jack.*

ELECTRICAL NETWORK CONNECTION: Two line bridged tip and ring.

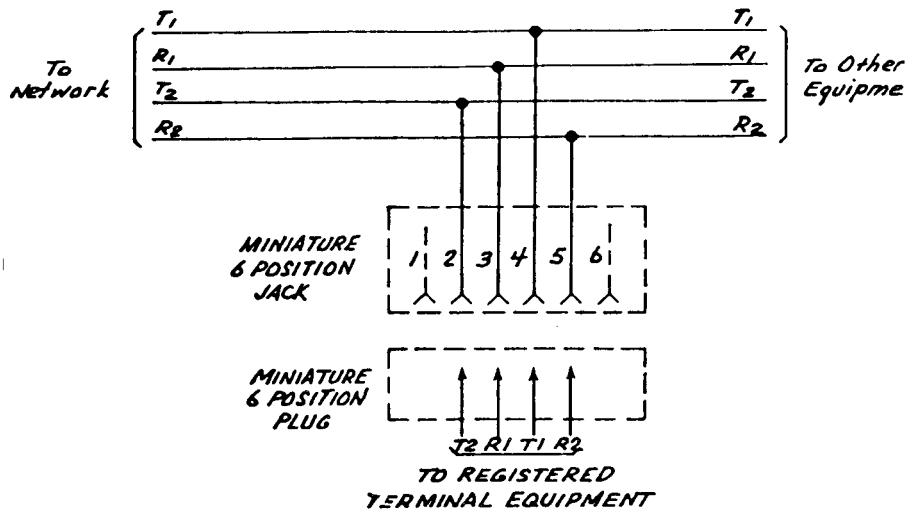
UNIVERSAL SERVICE ORDER CODE (USOC): RJ14W for Portable Wall-Mounted equipment—RJ14C for all others.

MECHANICAL ARRANGEMENT: Miniature 6-position jack.

TYPICAL USAGE: Two line non-key telephone sets and ancillary devices.

WIRING DIAGRAM:

NOTE: The telephone company will wire the lines to the jack in the sequence designated by the customer.



(d) *Multiple-line bridged configurations*—(1) *Up to 25 bridged T/R; 50-position jack.*

ELECTRICAL NETWORK CONNECTION: Multiple line bridged tip and ring.

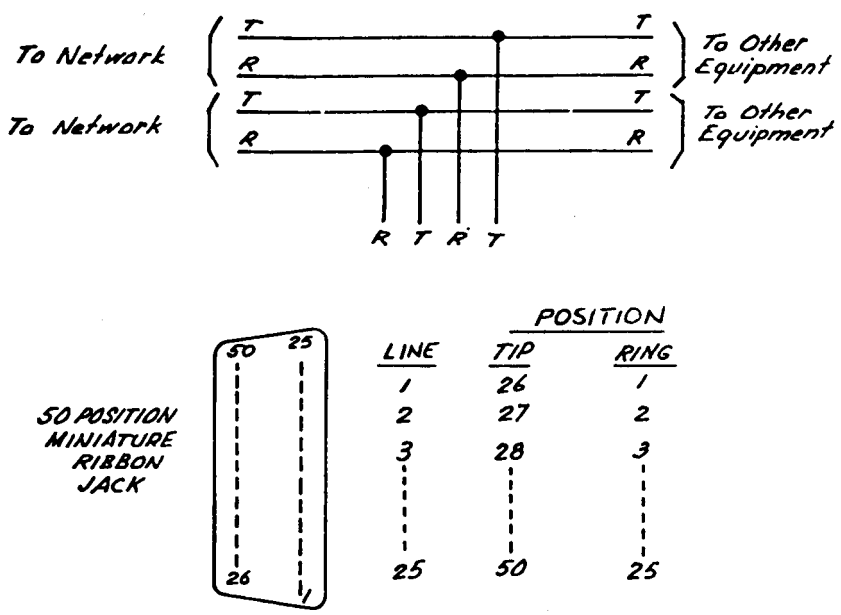
UNIVERSAL SERVICE ORDER CODE (USOC): RJ21X.

MECHANICAL ARRANGEMENT: 50-position miniature ribbon jack.

TYPICAL USAGE: Traffic data recording systems, PBXs and key telephone systems.

WIRING DIAGRAM:

NOTE: At the time the jack is ordered the customer must specify the sequence in which the central office lines are to be connected to the jack. The telephone company will consecutively wire these lines to the jack as shown below without skipping any positions.



(2) *Bridged multiple-line 50-position T/R with make-busy arrangement.*

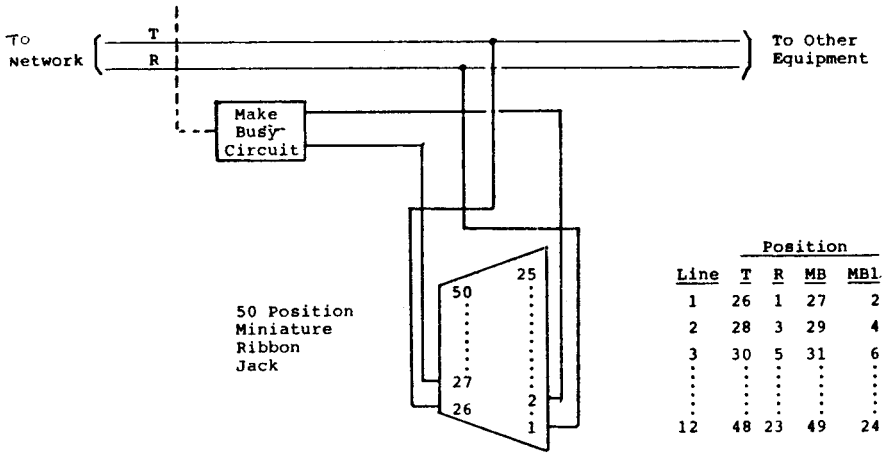
ELECTRICAL NETWORK CONNECTION: Multiple line bridge tip and ring with MB/MB1 leads for make-busy indication.

UNIVERSAL SERVICE ORDERING CODE (USOC): RJ2MB.

MECHANICAL ARRANGEMENT: 50-position miniature ribbon jack.

TYPICAL USAGE: 2–12 non-key telephone and ancillary devices connected directly to central office lines where a make-busy requirement is needed.

WIRING DIAGRAM:



(e) *Data configurations.* There are two categories of data configurations, which may be implemented either on an 8 position keyed data jack, or on a 50 position unkeyed ribbon jack. These are: a ''universal'' configuration, which incorporates both a programming resistor (for programmed data signal power limiting) and an attenuator (for ''fixed-loss loop'' data signal power limiting), and a ''programmed'' configuration, which incorporates a programming resistor, but not an attenuator. The programming resistor is selected as follows:

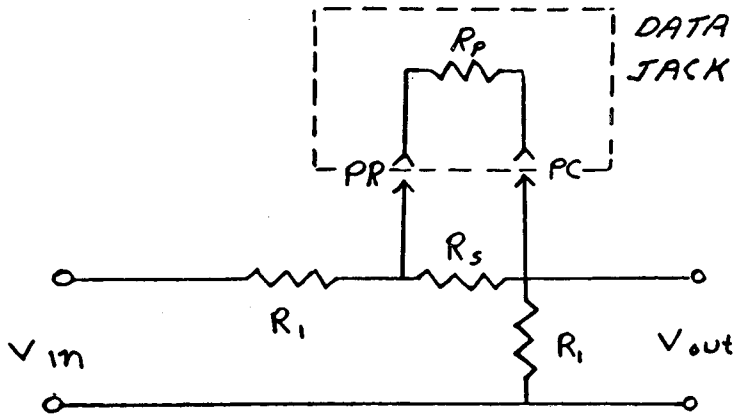
The proper programming resistor (Rp) shall be selected by the telephone company at the time of installation based upon the loop loss of the telephone line to arrive at the optimum signal power level of −12 dBm at the central office. The table shown below gives the required signal power output for the programmed data equipment for each value of the programming resistor.

Programming Resistor (Rp)*	Programmed Data Equipment Signal Power Output**
short	0 dbm
150 ohms	−1 dbm
336 ohms	−2 dbm
569 ohms	−3 dbm
866 ohms	−4 dbm
1,240 ohms	−5 dbm
1,780 ohms	−6 dbm
2,520 ohms	−7 dbm
3,610 ohms	−8 dbm
5,490 ohms	−9 dbm
9,200 ohms	−10 dbm
19,800 ohms	−11 dbm
open	−12 dbm

*Tolerance of Rp is ± 1%.
**Tolerance of programmed data equipment signal power output is ± 1 dB.

The voltages impressed on resistor Rp by the data equipment shall be such as not to cause power dissipation in Rp in excess of 50 milliwatts.

The circuit shown below was used in calculating values of the programming resistors and may be useful in implementing the automatic control of signal power output in the programmed data equipment.



R1 is the source impedance for the input signal Vin, and also the terminating impedance of the load. R_S is a series resistance, on which the computation of the programming resistor Rp is based. The table of values of Rp is derived for R_1=600 ohms; R_S=3600 ohms.

In ''universal'' configurations, the proper attenuator shall be installed or adjusted by the telephone company at the time of installation, based upon the loop loss of the telephone line, to arrive at the optimum power level of −12 dBm at the central office, with a data device maximum signal power level of −4 dBm.

The switch which is incorporated in ''universal'' configurations shall be operated to the position appropriate for the type of data equipment which is connected.

(1) *Bridged T/R; 8-position keyed data jack—Universal.*

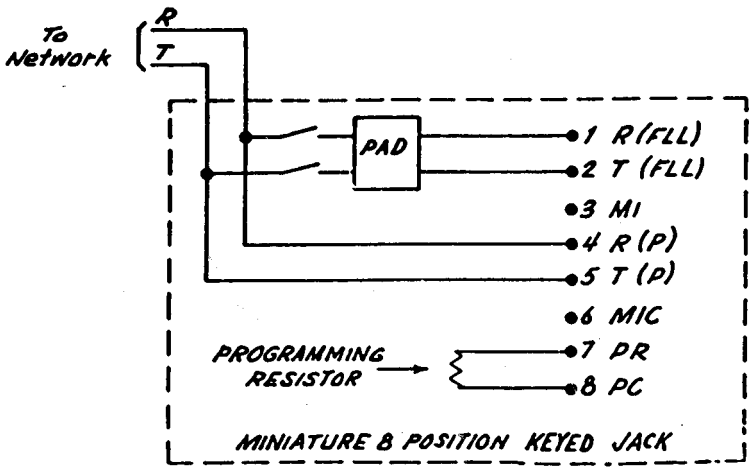
ELECTRICAL NETWORK CONNECTION: Single line bridged tip and ring.

UNIVERSAL SERVICE ORDER CODE: RJ41S.

MECHANICAL ARRANGEMENT: Single miniature 8-position keyed jack for surface mounting.

TYPICAL USAGE: Universal jack for fixed loss loop (FLL) or programmed (P) types of data equipment.

WIRING DIAGRAM:



(2) *Bridged T/R; 8-position keyed data jack—Programmed.*

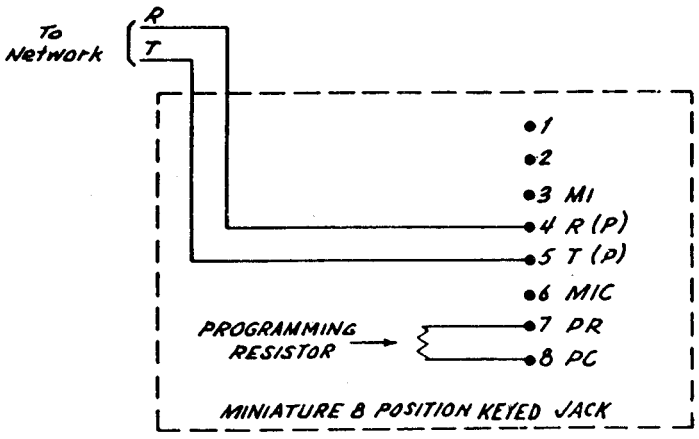
ELECTRICAL NETWORK CONNECTION: Single line bridged tip and ring.

UNIVERSAL SERVICE ORDER CODE: RJ45S.

MECHANICAL ARRANGEMENT: Single miniature 8-position keyed jack for surface mounting.

TYPICAL USAGE: Programmed data equipment.

WIRING DIAGRAM:



(3) *Multiple bridged T/R; 8-position keyed data jack—Universal.*

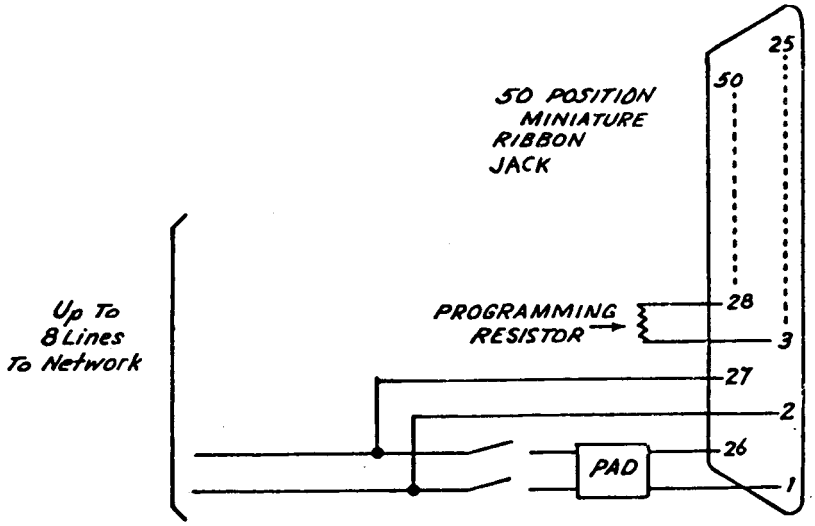
ELECTRICAL NETWORK CONNECTION: Multiple line bridged tip and ring.
UNIVERSAL SERVICE ORDER CODE: RJ41M.
MECHANICAL ARRANGEMENT: Up to 8 miniature 8-position keyed jacks in multiple mounting arrangement.
TYPICAL USAGE: Multiple installations of fixed loss loop or programmed types of data equipment.
WIRING DIAGRAM: Multiple arrangement of § 68.502(e)(1).

(4) *Multiple bridged T/R; 8-position keyed data jack—Programmed.*

ELECTRICAL NETWORK CONNECTION: Multiple line bridged tip and ring.
UNIVERSAL SERVICE ORDER CODE: RJ45M.
MECHANICAL ARRANGEMENT: Up to 8 miniature 8-position keyed jacks in multiple mounting arrangement.
TYPICAL USAGE: Multiple installations of programmed types of data equipment.
WIRING DIAGRAM: Multiple arrangement of § 68.502(e)(2).

(5) *Bridged T/R; 50-position ribbon jack—Universal.*

ELECTRICAL NETWORK CONNECTION: Single or multiple line bridged tip and ring.
UNIVERSAL SERVICE ORDER CODE: RJ26X.
MECHANICAL ARRANGEMENT: 50-position miniature ribbon jack.
TYPICAL USAGE: Universal jack for fixed loss loop (FLL) or programmed (P) types of data equipment.
WIRING DIAGRAM:

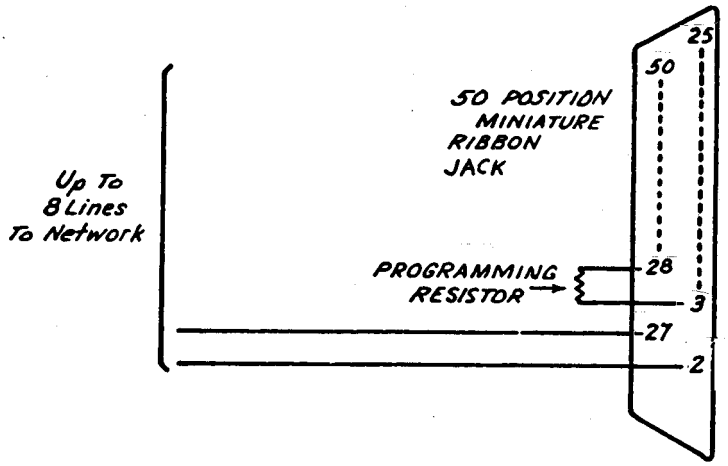


Line	Position					
	FLL		P		PR	PC
	T	R	T	R		
1	26	1	27	2	28	3
2	29	4	30	5	31	6
3	32	7	33	8	34	9
4	35	10	36	11	37	12
5	38	13	39	14	40	15
6	41	16	42	17	43	18
7	44	19	45	20	46	21
8	47	22	48	23	49	24

NOTE: At the time the jack is ordered, the customer shall specify the number of and sequence of central office lines to be connected to the jack. The telephone company will consecutively wire these lines to the jack in accordance with the table above, without skipping any positions.

(6) *Bridged T/R; 50-position ribbon jack—Programmed.*

ELECTRICAL NETWORK CONNECTION: Single or multiple line bridged tip and ring.
UNIVERSAL SERVICE ORDER CODE: RJ27X.
MECHANICAL ARRANGEMENT: 50-position miniature ribbon jack.
TYPICAL USAGE: Programmed jack for programmed (P) types of data equipment.
WIRING DIAGRAM:



Line	Position			
	P		PR	PC
	T	R		
1	27	2	28	3
2	30	5	31	6
3	33	8	34	9
4	36	11	37	12
5	39	14	40	15
6	42	17	43	18
7	45	20	46	21
8	48	23	49	24

NOTE: At the time the jack is ordered, the customer shall specify the number of and sequence of central office lines to be connected to the jack. The telephone company will consecutively wire these lines to the jack in accordance with the table above, without skipping any positions.

(f) *Multiple line series configurations*—(1) *Up to eight (8) position jacks.* Multiple series jacks in this category consist of multiple arrangements of configurations specified in paragraph (b) of this section, in a multiple mounting arrangement. Such multiple arrangements may be ordered as a unit under the following:

UNIVERSAL SERVICE ORDER CODE: RJ31M: Multiple series T/R ahead of all station equipment (reference §68.502(b)(1)).

[41 FR 28699, July 12, 1976, as amended at 44 FR 7959, Feb. 8, 1979; 46 FR 38516, July 28, 1981; 50 FR 47549, Nov. 19, 1985; 50 FR 49930, Dec. 6, 1985; 51 FR 951, Jan. 9, 1986]

§68.504 Universal patent license agreement.

UNIVERSAL PATENT LICENSE AGREEMENT

Effective as of ——— WESTERN ELECTRIC COMPANY, INCORPORATED, a New York corporation (''WESTERN''), having an office at 222 Broadway, New York, New York 10038, and ——————— (''the CORPORATION''), having an office at ——————— agree as follows:

ARTICLE I—DEFINITIONS

1.01 Terms in this agreement (other than technical terms, names of parties, companies and Article headings) which are in capital letters shall have the meanings specified in the General Definitions Appendix, and technical terms in this agreement which are in capital letters shall have the meanings specified in the Technical Definitions Appendix.

ARTICLE II—GRANTS OF LICENSES AND IMMUNITIES

2.01 WESTERN grants to the CORPORATION under WESTERN'S PATENTS nonexclusive licenses for products of the following kinds:

2.02 All licenses herein granted shall commence on the effective date hereof and, except as provided in Article V and notwithstanding the expiration of the FIVE YEAR PERIOD, shall continue for the entire terms that the patents under which they are granted are in force or for that part of such terms for which WESTERN has the right to grant such licenses.